IN THE CLAIMS

1. (Currently Amended) A tuning region of a semiconductor optical device comprising:

a substrate;

a first cladding layer over said substrate;

a waveguide layer provided over at least a portion of said substrate and said first cladding layer, at least a portion of said ~~device~~ waveguide layer having a concentration of recombination centers in the range of about $1x10^{16}$ cm^{-3} to about $1x10^{18}$ cm^{-3}, wherein said recombination centers are formed by doping said at least a portion of said ~~device~~ waveguide layer with impurity atoms selected from the group consisting of iron, chromium, manganese and copper;

a second cladding layer, said first and second cladding layers forming a p-n junction around said waveguide layer; and

electrical contacts to said first and second cladding layers for providing a bias of said p-n junction for the purpose of injecting carriers into said waveguide layer.

2. (Original) The tuning region of claim 1, wherein said concentration of recombination centers is in the range of about $2x10^{16}$ cm^{-3} to about $2x10^{17}$ cm^{-3}.

3. (Canceled)

4. (Original) The tuning region of claim 1, wherein said semiconductor optical device is a DBR laser.

5. (Original) The tuning region of claim 1, wherein said semiconductor optical device is selected from the group consisting of lasers, optical intensity modulators, optical phase modulators and optical filters.

6. (Original) The tuning region of claim 1, wherein said substrate is InP, and said waveguide layer is InGaAsP.

7. (Original) The tuning region of claim 6 further comprising a grating layer provided over at least a portion of said InGaAsP waveguide layer.

8. (Original) The tuning region of claim 7 further comprising a second cladding layer, said first and second cladding layers forming a p-n junction around said InGaAsP waveguide layer.

9. (Previously Presented) An optoelectronic device comprising:

a substrate;

at least one tuning region;

a first cladding layer;

a waveguide layer of said at least one tuning region provided over at least a portion of said substrate and said cladding layer, said waveguide layer having a thickness of about 2,000 Angstroms, and at least 100 Angstroms of said waveguide layer having a concentration of recombination centers in the range of about $1x10^{16}cm^{-3}$ to about $1x10^{18}cm^{-3}$;

a second cladding layer, said first and second cladding layers forming a p-n junction around said waveguide layer, and electrical contacts to said first and second cladding layers, said electrical contacts providing a bias of said p-n junction for the purpose of injecting carriers into said waveguide layer.

10. (Original) The optoelectronic device of claim 9 further comprising a grating layer over said at least a portion of said waveguide layer.

11. (Previously Presented) A method of introducing recombination centers in a tuning region of a semiconductor optical device, said method comprising the steps of:

forming a first cladding layer over a substrate;

forming an InGaAsP waveguide layer over said first cladding layer under conditions selected to provide recombination centers; and

subjecting said device to said conditions selected to provide recombination centers.

12. (Original) The method of claim 11, wherein said step of subjecting said device to said conditions selected to provide recombination centers includes lightly doping at least a portion of said waveguide layer.

13. (Original) The method of claim 12, wherein said at least a portion of said waveguide layer has a dopant concentration in the range of about $1x10^{16}$ cm^{-3} to about $1x10^{18}$ cm^{-3}.

14. (Original) The method of claim 12, wherein said step of forming said waveguide layer is simultaneous with said step of lightly doping said at least a portion of said waveguide layer.

15. (Original) The method of claim 12, wherein said step of lightly doping said at least a portion of said waveguide layer is subsequent to said step of forming said waveguide layer.

16. (Original) The method of claim 11, wherein said step of subjecting said device to said conditions selected to provide recombination centers includes varying the growth conditions of at least a portion of said waveguide layer.

17. (Original) The method of claim 11, wherein said step of subjecting said device to said conditions selected to provide recombination centers includes irradiating at least a portion of said waveguide layer with high energy particles.

18. (Previously Presented) The method of claim 11, wherein said substrate is an InP substrate.

19. (Original) The method of claim 11 further comprising the step of forming a second cladding layer over said waveguide layer.

20. (Original) The method of claim 11 further comprising the step of forming a grating region over said substrate and below said waveguide layer.